

**Excerpt From the Report from the Greenhouse Gas Working Group of the State
Advisory Board on Air Pollution**

Options for Addressing Greenhouse Gas Emissions

A number of response measures were discussed by sector in the report. This issue is complex as are the potential solutions and potential outcomes of various solutions. The working group generated a list of options to address greenhouse gas emissions. A consensus for recommendations was not reached; therefore, the list of options is provided for consideration. In addition, Appendix C provides an overview of policy options.

Suggested options for consideration:

DEQ/State Actions

- DEQ to develop a state-wide database of best management practices and success stories for industrial applications.
- DEQ to develop incentive program to encourage and recognize voluntary energy efficiency improvements, energy use reductions, or other significant greenhouse gas reduction measures achieved by industrial facilities.
- DEQ to provide coordination between various environmental networks (such as VREMS, VMA Environmental Committee, Virginia Chamber Natural Resources Committee, VMI, VNRLI, etc.) which currently exist in Virginia. The aim of such coordination efforts would be to promote voluntary reductions in GHG emissions through effective communication and sharing regarding GHG reduction efforts, programs, incentives, and recognition.
- Inventory of GHGs in VA to include sources covered by DEQ regulations. DEQ to develop guidelines for reporting. An inventory of other sources should be created and updated periodically.
- Creation of state program to encourage energy efficiency to address demand growth.
- With regard to energy efficiency renewable energy (EERE) set asides under a new CAIR rule (to be adopted by the APCB at its December meeting), it is important that EERE projects coming on line in one year have an ongoing opportunity to capture NOx emission allowances in succeeding years, thus displacing the availability of such allowances to fossil fuel-fired units.
- In a similar vein, the APCB could permanently set aside a given fraction of the total available NOx allowances for purposes of a "public health set aside", the rationale being that this could be a means to assist with

attainment of ozone standards in some regions of Virginia, especially as a warming climate is more favorable for ozone formation.

- The SAPCB should express its desire that the reduction of greenhouse gas emissions be given a prominent role in the development of state energy policy.
- Taxes on fossil fuels and electricity that are related to their GHG emissions and other environmental impacts can be considered as a means to “internalize” environmental costs of these energy forms.
- The SAPCB should be mindful in considering any action under its jurisdiction to reduce the emission of precursors to the formation of ground-level ozone that ground-level ozone is a greenhouse gas, as well as being hazardous to human health and welfare. Thus, more stringent reduction measures may be justified because of these co-benefits.
- The SAPCB should consider the merits of allocating NO_x allocations under its proposed CAIR rule on the basis of the net energy generated by utility units, new and existing rather than only for new units, as is proposed.
- The SAPCB should consider requiring a utility's application to construct a new fossil fuel fired power plant to include in its application all design provisions that are technologically and economically feasible at the time of application that will facilitate the future capture and sequestering of its carbon dioxide emissions.
- The SAPCB should consider requiring a utility's application to construct a new fossil-fuel fired power plant to demonstrate that its design is based on the most efficient energy conversion technology that is technologically feasible at the time of application, consistent with other considerations such as reliability and compliance with environmental and safety regulations.
- A Blue Ribbon Commission should be appointed by the Governor and the leadership of the General Assembly to study the full range of policy options available to slow and eventually halt global climate change, and to make recommendations on which of these options are most suited for adoption by the Commonwealth. Members of this Commission should have a broad range of environmental policy expertise and represent the diverse parties at interest with respect to this issue within the Commonwealth.

- Evaluate options for Virginia participation in the Regional Greenhouse Gas Initiative.
- The State should consider/support EPA policies and measures that seek to improve the new source review process and provide regulatory certainty in order to facilitate the implementation of projects that increase energy efficiency, thereby reducing fuel consumption and carbon emissions.
- The State should consider nuclear power's significant contribution toward clean air and greenhouse gas mitigation in the evaluation and permitting of nuclear unit license renewals and capacity uprates.

Transportation

- The General Assembly and Governor should consider an escalating gas tax over time to send a clear signal to consumers that they should make their vehicle purchases with increased fuel prices and increasing energy efficiency in mind; and further, should make clear to consumers the implications for increasing cost over the next decade of each mile traveled. Such an increasing gas tax should be revenue neutral, perhaps combine with a decreasing rate on the state income tax.
- Promote anti-idling and other diesel emission reductions. EPA estimates that 9.6 million gallons of diesel fuel is wastes annually in Virginia from truck idling. This results in 1,776 tons of NO_x and 45 tons of particulate matter emissions as well as GHG and other emissions.
- Resources could be provided to DEQ, in cooperation with other agencies, such as DMME, DMV, and VDOT, and in conjunction with the EPA SmartWay Partnership to promote anti-idling and other trucking energy efficiency measures. Promotion could include outreach and education to the freight sector. Also, more robust funding of the Small Business Environmental Compliance Loan Fund, a low-interest loan fund administered by DEQ and the Department of Business Assistance could target this sector. Other financial support and such measures as sales and use tax waivers or income tax credits for anti-idling and related equipment could be considered.
- Evaluate adoption of “California car” standards: Under the Clean Air Act, states may opt for either default federal tailpipe standards or California standards. The New England states (other than New Hampshire), New Jersey, New York, Oregon, Pennsylvania, and Washington state are states that have or plan to adopt the California. California adopted AB 1493, which sets tail-pipe standards for CO₂. However AB 1493 is under litigation. Virginia could track the status of this and evaluate potential impacts if California standards were to be adopted by Virginia.

- Waive sales and use tax on light-duty vehicles meeting 40 or more miles-per-gallon of gasoline equivalent according to EPA and certified by California as meeting superultralow emissions (SULEV) standards.
- Mass transit planning and support: The Virginia Railway Express and Washington, DC Metro system as well as public bus systems in the Commonwealth save energy, mitigate GHG and conventional pollutant emissions, and reduce traffic congestions. The state can work with the Department of Rail and Public Transportation, localities, and transit authorities to promote mass transit options and local land use planning consistent with public transit, pedestrian, and bicycle transportation modes.
- Provide localities with tools for adequate transportation and land use planning and implementation: This can include allowing localities to charge development fees to assure provision of public infrastructure and services.
- State procurement: require minimum fuel economy standards for state vehicles, buy hybrid gasoline-electric vehicles, procure and use biodiesel and ethanol fuels.
- Support through procurement, tax incentives, loans, or loan guarantees public availability of E85 (fuel mixture of 85 percent ethanol and 15 percent gasoline), and analyze potential institutional impediments to E85 and other biofuels. (Some states—for instance, New York—found that some service stations were contractually prohibited from selling fuels not offered by their affiliated supplier. This meant that stations affiliated with major petroleum brands could not offer E85 if those brands did not offer E85.)

Electric power

- Recommend to Congressional delegation that a nationwide strategy that addresses economy-wide greenhouse gas contributions be created. Creation of state or regional greenhouse gas strategy might not have the desired environmental effect and will create economic disparity among those that have and do not have programs.
- Evaluate an alternative or renewable portfolio standard: A growing number of states require electric utilities to source a percentage of their generation—directly or via third party power providers—to be from renewable sources. The Pennsylvania alternative energy portfolio standard also includes certain waste-to-energy, clean coal, energy efficiency, and combined heat & power technologies and measures.
- Consider systems benefit changes on electric and, perhaps, natural gas utilities, as done in various states, to fund clean energy projects through rebates and other means.

- Provide tax, loan guarantee, or other incentives for the next utility-scale coal fueled power plant to be an Integrated Gasification Combined Cycle power plant: IGCC offers the next generation of clean coal technologies that can revitalize the role of coal in a more environmentally sensitive world. IGCC offers the potential option for collection and sequestration of CO₂ in geologically suitable sites, such as in southwestern Virginia. The technology can clean synthesis gases to remove sulfur, mercury, and other contaminants much more effectively than with scrubbing of flue gases. Less water is used and fewer wastes generated than with pulverized coal. Synthesis gases can be used as chemical feedstocks or be processed into very clean vehicle fuels.
- Ensure adequate NO_x allowance “set-asides” and other measures under the Clean Air Interstate Rule to promote energy efficiency and renewable energy projects: Energy efficiency and renewable energy (EERE) projects displace or reduce GHG and conventional emissions from fossil fueled power generation. In some states, such as Maryland, Indiana, and Massachusetts, there are significant set-asides of NO_x allowances for such projects and there are mechanisms to retire allowances to assure that allowances are not used to emit NO_x elsewhere. Such measures are important in order for EERE measures to be recognized in State Implementation Plans as NO_x reductions.
- Require the Commonwealth of Virginia to buy a portion of its electricity from renewable “green” sources.
- Utilities could be required to have innovative approaches for using energy efficiently.
- Utilities (both electric and gas), either by legislative action or regulatory direction from the State Corporation Committee, could be directed to initiate demand side management (DSM) programs that reduce energy consumption for all consumers (to include but not be limited to residential, commercial, industrial and governmental). Furthermore, the action or direction given should allow utilities to both recover the costs of these DSM programs and also realize a return on their investment in these DSM programs equal to the revenues that the utilities are permitted to realize on new generation or supply (this latter concept is commonly referred to in the industry as decoupling revenues from sales).
- The option for additional nuclear power should be retained as an important carbon-free source of power that can make a significant contribution toward energy diversity, energy security and clean air in Virginia.

Buildings and facilities:

- Require state construction to meet, at a minimum, the equivalent of LEED Certification or the appropriate Energy Star Building standard. Promote

and develop incentives for state construction to meet higher LEED categories.

- Evaluate opportunities to strengthen energy codes within the state's building codes.
- Support education and training on energy efficiency and green building approaches for public and private sector facilities managers as well as architects, engineers, and buildings trades professionals. Provide financial support to DMME to offer workshops, division, and the private sector on energy efficiency and renewable energy in facilities' design, construction, and operations and maintenance. The state should take of advantage of expertise and instruction offered by the U.S. Department of Energy's Best Practices program (which includes steam, motors, compressed air, and process heat management) and its Building America and Rebuild America programs. Coordination with the Department of Professional and Occupational Regulation could be used to promote such training for continuing education credits and registration and licensure.
- Waive sales and use tax for Energy Star rated appliances and other products and equipment.

Appendix C

A Primer on Environmental Policy Tools for Greenhouse Gases

Although reducing GHG and other pollutant emissions can sometimes yield financial benefits through improved efficiencies, emissions reductions are not desirable for its own sake but for reduced environmental and health impacts, including impacts of climate change. Many environmental economists and environmental policy experts believe that the best way to reduce these impacts is to make those who create pollution, waste, and other environmental hazards pay for them, either by directly preventing, controlling, and cleaning up the damage or by paying compensation for negative health and environmental consequences. This is also known as the *polluter pays principle*—those who create pollution should pay for its impacts, not taxpayers, society in general, or the victims harmed. By “internalizing” these “external” environmental costs, users of more polluting and environmental damaging technologies and practices will have to pay more, which makes cleaner processes, such as improved energy efficiency, cleaner energy (whether fossil or renewable), and carbon sequestration more economically attractive.

A difficulty with implementing the polluter pays principle is that health and environmental impacts are often uncertain and hard to monetize. How many dollars of damage does a ton of CO₂ cause via global warming? What is a ton of nitrogen oxides' cost in terms of increased asthma attacks, nutrient loading of coastal waters, smog damage to crops, or acid rain damage to lakes and forests? However, we know these costs are not zero and that current environmental controls required in the United States and Virginia allow significant health and environmental damage and do not address global climate change.

Policymakers can use several approaches to internalize environmental costs to address climate change. Many of these also enhance air quality and promote other environmental and public health objectives. Among the tools:

- Command-and-control regulations, including building and product standards,
- Pollution caps and tradable pollution allowances (cap-and-trade),
- Environmental fees or taxes,

- Renewable or alternative energy portfolio standards,
- Subsidies and tax incentives,
- Procurement standards and preferences,
- Research and development (R&D) funding.

Command-and-control is the traditional regulatory approach. It requires plants, products, and activities to achieve specific levels of pollution control and often specifies particular equipment and practices. Such regulations helped achieve significant power plant, industrial, and vehicle emissions reductions in the past. Building energy codes and product standards on such things as appliances and windows have also achieved significant benefits in terms of energy efficiency and, thus, avoided emissions. However, command-and control regulations tend to lack flexibility or incentive for going beyond specific regulatory requirements unless there is a predictable schedule of tightening standards. Also, they tend not to do a good job of channeling market forces to achieve the most cost-effective results.

Under a *cap-and-trade system* allowances are issued to permit some maximum amount of emissions.^[1] Allowances may be allocated by auction, allotted based on past emissions, or a combination of the two. Over time the number of allowances available may be reduced to lower overall emissions. While there may still be some base level of command-and-control regulation in force, emitters would have the flexibility to meet their requirements by strengthening pollution controls, using cleaner fuels, or buying excess allowances from others who have achieved greater reductions than would otherwise be necessary. Also, for GHGs, emitters could be credited for carbon sequestration activities, such as reforestation. The U.S. SO₂ cap-and-trade system under the Clean Air Act Amendments of 1990 is credited with achieving greater emissions reduction at lower cost than would have been accomplished through command-and-control. (Burtraw and Palmer, 2003)

Cap-and-trade is often suggested as the most feasible means to regulate CO₂. The Kyoto Protocol, which the United States did not ratify, allows international trading so that firms can buy CO₂ reductions elsewhere if they are cheaper than at home. The Regional Greenhouse Gas Initiative adopted by a number of states (and described elsewhere in this report) includes a multi-state cap-and-trade system for CO₂. (RGGI, 2006) The National Commission on Energy Policy recommends a national cap-and-trade system for CO₂, as have some bills proposed to Congress. (NCEP, 2004) The Commission recommendation includes a provision allowing power plants to buy additional allowances at a set price if capped allowances become too expensive. This would provide an economic safety valve to prevent the possibility of excessive cost and disruption to power supplies while still providing significant incentive for energy efficiency and renewable energy.

Environmental taxes or fees are charges for emissions, effluents, wastes, or other environmental insult. Revenues can go to environmental and energy programs or they can be used for general revenue, perhaps with corresponding reductions in income and other taxes to achieve revenue neutrality (i.e., no net tax increase) and to help move the tax base more toward taxing “bads” (e.g., pollution and waste) rather than “goods” (labor, savings, and investment). U.S. power plants and other facilities requiring major source permits under the Clean Air Act pay an annual fee—\$38.78 per ton in 2004—for SO₂, NO_x, volatile organic compounds, and particulate matter emissions. However, the fee, whose purpose is to fund permitting programs, is capped at 4000 tons for each pollutant, thus providing no emissions reduction incentives for large emitters. And they do not address CO₂. “System benefit charges” or “public benefit fund” charges are imposed by 15 states and the District of Columbia on electric bills to provide money to subsidize energy efficiency, renewable energy, and other clean energy options. (DSIRE, 2006) Carbon fees have been proposed as a mechanism to attack CO₂ emissions, either as a stand-alone charge or, as recommended by the National Commission on Energy Policy, as a backup or safety valve to a cap-and-trade program.

As described elsewhere in this report, 22 states and the District of Columbia have *renewable or alternative energy portfolio standards* (RPS or AEPS) that require electric utilities to derive a certain proportion of their electric power from renewable or alternative sources, either directly or via other power generators.^[2] (DSIRE, 2006) The typical RPS includes a timeframe over which the required renewable energy proportion is increased. An RPS may have a tradable allowance component that allows utilities to trade in renewable energy certificates (also called green tags) that certify delivery of renewable energy to the electric grid. An attempt to include a federal RPS in the Energy Policy Act of 2005 failed. An RPS could include a price cap as a safeguard to limit potential cost increases.

Subsidies and tax incentives include federal renewable energy tax credits authorized under the Energy Policy Act for certain energy measures as well as certain U.S. Department of Agriculture support. Various states support clean energy investments with rebates, grants, loans, and tax incentives. These range from low-interest loans for diesel anti-idling equipment for trucks to rebates for solar energy investments to tax waivers or credits for buying hybrid cars or Energy Star rated appliances. As noted, some states use system benefit charges fund such measures but others do not. Land conservation measures to enhance carbon sequestration can also garner such state support through tax incentives.

Procurement provides a market for cleaner goods and services. Federal, state, and local governments as well as a growing number of private companies and organizations engage in green procurement to promote a range of environmental values ranging from reducing toxicity of products to promoting recycling to addressing global warming. Building LEED certified or Energy Star buildings, buying energy efficient vehicles (such as hybrids) and equipment, and procuring renewable green power are among the ways a state, locality, or other entity can propel environmentally and climate friendly goods and services. Arlington and Fairfax Counties are among the Virginia localities that have joined out-of-state localities, other states, and federal agencies in buying green power. They and others are also establishing green building requirements for public procurement. A number of Virginia state agencies, such as DEQ and the Department of Mines, Minerals, and Energy, have incorporated efficient hybrid vehicles in their motor pools and discouraged heavy SUVs except where justified by intended uses. The Department of Transportation and various transit agencies are growing customers for biodiesel fuel. State and local procurement can provide strong market signals.

Another tool to promote renewable energy is support of *R&D funding*, particularly since technical and economic hurdles remain significant hindrances to advanced agricultural, energy, and industrial technologies and practices for GHG emissions reduction.

Scholars from Resources for the Future assessed the likely effectiveness and costs of these tools. (Fischer and Newell, 2004; Palmer and Burtraw, 2004) They suggest that the RPS route and other renewable energy subsidies may be most effective for increasing renewable energy but that carbon-focused measures, such as a CO₂ cap-and-trade allowance system or emissions fees, would be more effective at reducing CO₂ emissions. Combining these approaches has merit as well as costs. The studies also suggest that a focus on R&D is perhaps the most costly and least efficient route among the policy approaches examined to reduce GHG emissions. An R&D emphasis is a technology-push strategy that needs to be matched with market-pull policies and conditions in order to effectively introduce and diffuse new technologies into the marketplace.^[3]

Some critics say that renewable and clean energy is already heavily subsidized, unnecessarily raising costs and distorting markets. However, this ignores the implicit subsidy to fossil energy from human health and environmental impacts. Also, they do not consider the heavy direct taxpayer subsidies given to fossil and nuclear power.

At the federal level, the Congressional Research Service noted overwhelming preference for nuclear and fossil energy R&D over that for energy efficiency and renewable energy. During fiscal years (FY) 1973 through 2003 federal R&D spending (in year 2003 constant dollars) for nuclear fission and fusion amounted to \$49.7 billion, for fossil energy \$25.4 billion, for renewable energy \$14.6 billion, and for energy efficiency \$11.7 billion. (Sissine, 2005) Non-R&D subsidies to fossil and nuclear energy also abound, including liability limitations for nuclear power plant operators; immediate expensing of coal, oil, and natural gas exploration and development costs; highly generous depletion allowances and “intangible” drilling cost tax deductions; federal subsidy of the Black Lung Fund; non-conventional fuel production tax credits that have mainly benefited fossil fuel production; eligibility of advanced nuclear reactors for loan guarantees and production tax credits under the Energy Policy Act; and an Energy Policy Act provision to provide \$1 billion over four years to states that produce offshore oil and gas, among others. In comparison, subsidies and tax benefits applied to energy efficiency, renewable energy, and other GHG reduction approaches may not appear so generous.

Source: Sobin, Rodney: forthcoming, "Myth: Renewable Energy Systems Could Never Meet Growing Electricity Demand in America," in B.K. Sovacool and M.A. Brown (eds.) *Energy and American Society: Thirteen Myths*, Springer Press, The Netherlands.

^[1] The phase down of leaded gasoline in the United States and wetland banking to compensate for wetland development are non-emissions examples of this approach. Certain fishing allowances and New York City taxicab medallions are still other cap-and-trade examples.

^[2] Pennsylvania has an alternative energy portfolio standard that includes, in addition to renewable energy, certain non-renewable energy technologies such as advanced cleaner coal, coal waste utilization, and combined heat and power technologies.

^[3] See discussion of technology-push, market-pull, and models of innovation in OTA (1995).